ENVIRONMENTAL PROTECTION AGENCY (EPA)
2019 & 2020 Targeted Airshed Grant Program
RFA#: EPA-OAR-OAQPS-20-01

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Project Title: Reduce Emissions in Localized Areas - Residential Woodburning Devices and Lawn and Garden Replacement Program

Applicant Information:

Applicant Name:	Bay Area Air Quality Management District (BAAQMD)
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Total Project Cost:	$10,111,954
EPA Funds Requested:	$8,864,372
Voluntary Cost Share:	$1,247,582

Short project description: The project will replace 2860 units of combustion-fueled residential and commercial lawn and garden equipment with battery-electric units and 760 residential wood-burning devices with electric heat pumps.

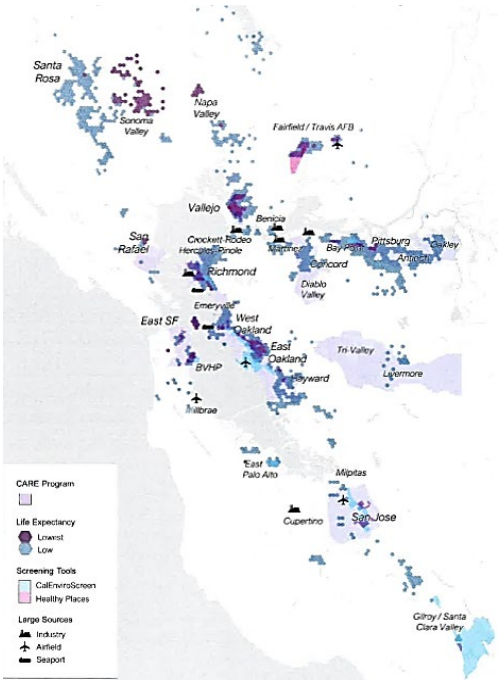
Project Period: Beginning date: August 2020; Ending date: August 2025

Project Location: San Francisco Bay Area air basin, prioritizing funding for the most highly-impacted areas, Environmental Justice communities, and low-income residents.

1. Project Summary and Approach

Approach and Technology. The Bay Area Air Quality Management District (BAAQMD) was created by the California Legislature in 1955 as the first regional air pollution control agency in the country. The BAAQMD aims to create a healthy breathing environment by protecting and improving public health, air quality, and the global climate. The BAAQMD regulates and permits stationary sources of air pollution, conducts air quality monitoring, planning, enforcement, outreach and community engagement, and utilizes grant and incentive programs to support its mission. The San Francisco Bay Area air basin is home to seven million residents and includes the nine counties shown in Figure 1.

Figure 1. Maps of the San Francisco Bay Area air basin and Community Health Projection/ Environmental Justice Areas.



In developing BAAQMD's proposal, staff considered source categories that significantly contribute to emissions of Particulate Matter 2.5 microns and smaller (PM2.5) in the region, community member input regarding their priorities for clean-up of sources that contribute to increased health risks; includes localized exposure from PM emissions, programs and activities taken and planned by the BAAQMD, and programmatic and funding gaps that, if filled, could effectively achieve permanent PM2.5 emissions reductions.

Mobile sources, including lawn & garden equipment, wood-burning devices, and stationary and portable engines contribute to high health risks and localized exposure from PM2.5. The replacement of wood-burning and combustion-powered devices has been demonstrated as an activity that effectively achieves cost-effective permanent surplus reductions of PM2.5. However, BAAQMD has limited or no regulatory authority over these sources and only limited funding for programs that target their replacement.

As regulations on emissions standards for mobile and stationary sources become increasingly stringent, grant and incentive programs have helped equipment owners and operators to voluntarily upgrade older, highly polluting, combustion-powered equipment with the cleanest available technologies in advance of regulatory requirements. Incentive programs funded by the EPA, state, and local sources have played a critical role in complementing the BAAQMD's planning and regulatory efforts to reduce PM 2.5. Since 1991, the BAAQMD has administered more than $1.2 billion in funding, including the successful completion of the Diesel Emissions Reduction Act (DERA) grants. These incentive programs are designed to achieve voluntary or "surplus" emission reductions, i.e., reductions in advance of, or over and above, regulatory requirements or standards. Over the past five years, BAAQMD has annually awarded on average $65 million through its grant and incentive programs, however this funding either may not, or only on a very limited basis, be used to fund lawn & garden equipment, wood-burning devices, and stationery and portable engine replacement projects.

For these reasons, this application discusses the BAAQMD's proposed use of EPA Targeted Airshed Grant (TAG) program funds. Funds would be used to**:**

- **augment available funding to accelerate the replacement of highly polluting woodburning devices and Lawn and Garden (L&G) equipment, and;**
- **expand the types of L&G equipment that can be targeted for replacement.**

BAAQMD is also submitting a separate application to the EPA's TAG program for a proposal to target emissions reductions through the accelerated replacement of stationary and portable prime and back-up generators.

EPA TAG funding would be used to fund the scrap and replacement of all types of gas- and diesel-fueled L&G devices with zero-emissions electric battery equipment; including low and high horse-powered mowers, blowers, chainsaws, and line and hedge trimmers, for both residential and commercial operators.

The BAAQMD has previously awarded incentive funding from the California Carl Moyer Program and mitigation action settlement agreements to sub-grantees for replacements of L&G equipment from residents and commercial operators. Using settlement funds, the BAAQMD has periodically held lawnmower exchange programs for residents over the past 15 years and more recently, held a commercial L&G replacement program for public agencies in Alameda and Contra Costa counties. These programs were highly effective at reducing localized sources of PM2.5 and NOX emissions and extremely popular with residents and fleet operators. The BAAQMD has also used its Carl Moyer Program to fund replacement projects however the Carl Moyer guidelines have restrictions and only allow funds to be used for the replacement of ***lawnmowers from residents and mowers greater than 50hp from commercial operators***.

In 2008, the BAAQMD Board of Directors adopted a Wood-Burning Devices Rule to ban burning of wood on days predicted to have high levels of fine particulate matter. In support of the 2008 rule, the BAAQMD revised its Spare the Air outreach campaign to include public messages about the harmful emissions from woodsmoke and to encourage residents to burn less. To complement

the rule, the BAAQMD has since 2008 invested over $3 million of its own funding to replace more than 1,000 residential wood burning devices (fireplaces and woodstoves).

Although the BAAQMD's extensive efforts to reduce woodsmoke have been effective, its incentive funding has been limited. As some Bay Area homes still rely on wood burning devices for heating purposes, woodsmoke continues to impact the health of individuals both regionally and locally. Besides its General Fund, the BAAQMD does not currently have any other source of funding that can be used to for replacement of woodburning devices. EPA funding will provide much needed incentive funds to continue the reduction of PM2.5 and toxic contaminants through replacement of woodburning devices with electric heat pumps; a clean, innovative, and underutilized heating alternative.

Other Activities and Technologies Considered.

Although electric-start hybrid lawn and garden equipment exists, this technology does not provide the cleanest available option or the permanent elimination of emissions or localized exposure. Zero-emissions equipment was selected as the only replacement option as it would effectively reduce PM2.5 and NOX emissions regionally, as well as maximize health protection for workers and community members who live, work, and play in areas where lawn and garden equipment are commonly used. There are also co-benefits with battery electric equipment such as noise reduction. Today, zero-emission L&G equipment technology is available commercially and has been shown to perform the same or better than its combustion-powered equivalent and is nearing cost parity with gas-and diesel-powered equivalent equipment. Additionally, many Bay Area cities have recently enacted natural gas bans so BAAQMD's approach for zero-emissions technologies best aligns with local government policy.

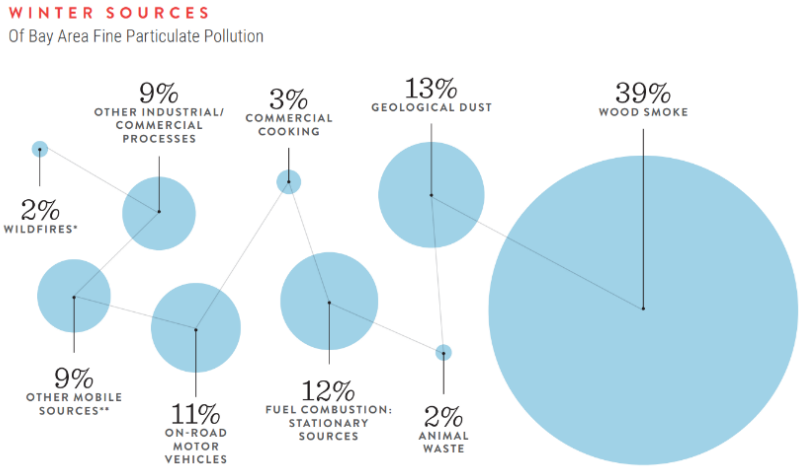
As the BAAQMD's rule prohibits use of non-EPA certified wood-burning devices on Spare the Air nights which often coincide with the coldest winter nights, an upgrade to EPA-certified would not be considered as "surplus" in our region. Early iterations of the BAAQMD's woodsmoke reduction inactive programs allowed the installation of gas logs, gas inserts, and EPA certified wood-burning devices. More recently replacement options were limited to efficient heating alternatives, e.g. natural gas stove and fireplace inserts and electric heat pumps. In 2019, many cities in the Bay Area started to implement natural gas bans. In response, BAAQMD is proposing that wood stove and fireplace replacement options be limited to electric heat pumps in order to achieve the maximum permanent emissions reductions and co-benefits (i.e., efficient healing) and to align with policy from local jurisdictions.

Emissions Inventory, Key Source Categories. Overall, air quality in the San Francisco Bay Area has improved greatly over the past four decades. BAAQMD is in attainment of national standards for four of the six criteria pollutants. While ozone and PM levels have lowered significantly over time, on certain days, the San Francisco Bay Area's air quality exceeds state and national standards for ozone and PM. In 2018, there were twenty days of exceedances in the region for the National 24-Hour PM2.5 Standard and three days of exceedances for the National 8-hour ozone standard. As wildfires become more frequent, the need and urgency to reduce all controllable and significant localized sources of PM2.5 increases.

Based on the BAAQMD's 2011 *Baseline Emission Inventory Projections for 2015 and 2020—Annual Average Inventory for PM 2.5 (Tons/Day)*, grand total emissions in the San Francisco Bay Area is calculated at 46.6 tons/day of PM 2.5. Key contributors of PM 2.5 in the San Francisco Bay Area come from fuel combustion at industrial sources such as refineries and manufacturing facilities (12%), and an almost equally large percentage of PM 2.5 comes from on-road motor vehicles (11%). L&G equipment contributes 0.3 tons per day (0.6%), while residential woodburning contributes over 11 tons per day (25%) as based on the annual average inventory. For further detail, please see *Other Narrative Attachments- Emission Inventory Data.* The inventory captures regional concentrations and apportionment of emissions by source category. Locally, emissions reductions resulting from the proposed projects will directly reduce PM 2.5 and toxic contaminants within the region's most highly impacted communities.

L&G equipment may be powered by either gasoline or diesel fuel. Diesel exhaust includes over 40 substances that are listed by the EPA as hazardous air pollutants and by the California Air Resources Board (CARB) as toxic air contaminants. Diesel exhaust can trigger immediate respiratory distress, particularly in children, the elderly and those with asthma, COPD, emphysema, and other chronic lung and heart conditions. Impacts most often fall heavily on communities already significantly impacted by air pollution, environmental hazards, and economic inequality.

The impact of harmful emissions from diesel exhaust particulate are exacerbated by the additional PM generated during catastrophic wildfires, which have become more severe and frequent in recent years, and days when ambient PM becomes trapped by an inversion layer, which is common in wintertime. During the winter season, the proportion of PM 2.5 attributed to residential wood burning increases even more (39%), as displayed in the Figure below. The proposed incentive program would help reduce wintertime PM by targeting residents whose main heating source is an inefficient wood-burning device to replace it with a more efficient and zero-emissions heating technology.



The replacement of combustion-based L&G equipment and wood burning devices with zero-emission technologies can achieve permanent surplus reductions in PM 2.5. T**he proposed approach would reduce an estimated 13.8 tons per year of PM 2.5 emissions, or 2.1 and 11.7 tons per year of PM 2.5 for L&G and wood burning devices, respectively. The proposed**

project is also estimated to reduce 7 tons per year of NOx emissions. These reductions will help the region attain National Air Quality Standards for PM25 and Ozone and decrease localized sources of exposure to toxic diesel exhaust in its most highly impacted communities.

Lowest emission technology available. The proposed L&G and wood-burning programs will help to achieve the maximum possible permanent emissions reductions and community health benefits. L&G combustion powered equipment would be replaced with zero-emission battery-electric equipment. Zero-emission L&G equipment typically utilizes lithium-ion batteries that can provide up to four hours of charge, as well as the flexibility to quickly switch out a new battery if operators must continue to run the equipment without pausing to recharge. Fully electric equipment requires no gas and produces no exhaust particles. This project would target commercial gardeners, public agencies, and residents.

Wood burning fireplaces and stoves would be replaced with electric heat pumps. Heat pumps are an innovative and zero-emission technology, utilizing electricity to run a compressor that collects and concentrates heat from its surroundings. The acquired heat is then used to warm an indoor space. Heat pumps are the most efficient home-heating option as electric energy is used to *move* heat, rather than create it. Electric heat pumps are significantly more efficient than wood burning fireplaces that are typically only 7% efficient. Compared to natural gas heaters that run at 60-95% efficiency, electric heat pumps outperform by an impressive factor of three to five times.[1] Though electric heat pumps are common in new homes and commercial buildings, they are less common in many of the Bay Area's older residential homes. The proposed outreach strategy for the deployment of 760 heat pumps will be used to support a broader community education and technology adoption for this underutilized and clean heating technology.

Roles and Responsibilities. The BAAQMD will serve the role of Program Administrator and will be responsible for:

- program development: developing a list of eligible equipment and manufacturers, preparing solicitation and outreach materials, updating BAAQMD's existing grants management system to accept, process, and track applications, and contracts awarded;
- conducting public outreach to potential applicants through website development, e-mails and other social media;
- reviewing and evaluating applications, and contracts;
- project monitoring and reporting;
- For the L&G component: coordinate 3-6 retail exchange events per year, performing audit inspections for 10% of both old and/or new equipment.

BAAQMD will also sub-contract with community groups for input on program development and local outreach services and may also utilize sub-contractors selected through a formal Request for Proposals process, on a limited basis, to fulfill some of these functions e.g., in cases where administrative savings or other efficiencies can be achieved.

Sub-grantees will be responsible for:

- requesting vendor quotes for installation of electric heat pumps;

[1] https://www.nrdc.org/experts/pierre-delforge/electric-heat-pumps-can-slash-emissions-california-homes

- initial payments and filling out voucher forms or applications with required documentation;
- where applicable, signing contracts;
- scheduling and implementing the removal and destruction of old equipment or in the event of L&G exchange retail events, bringing in their old equipment;
- purchasing and documenting the new zero-emission technology, processing requests for reimbursement; and
- cooperating with grant program requirements: e.g., reporting, inspections, and audits

Dismantlers and contractors will be responsible for:

- the destruction of old equipment and verification forms; either directly submitted to the BAAQMD or indirectly by sub-grantees to submit to BAAQMD; and
- public outreach and community engagement: participation in program development, selection of L&G change-out event locations, and event promotion

2. Community Benefits, Engagement and Partnerships

Historically, the BAAQMD's programs have focused on improving air quality on a regional scale, focusing on sources that have the largest emissions region-wide. However, today there is recognition that while air quality has improved over time, some of the Bay Area's communities are still experiencing disproportionate impacts from air pollution and other environmental hazards. These communities were identified through assessments of air quality, health, and other metrics of vulnerability by the BAAQMD's Community Air Risk Evaluation Program (CARE) and, more recently, through our Community Health Protection Program (CHPP)[2]. The areas identified are consistent with the results from other state-wide and national assessments, including Cal Enviroscreen, EJ Screen, and the Healthy Places Index.

Through the CHPP, the BAAQMD partners with community members and environmental justice organizations on community-led activities to identify and understand air pollution concerns on a hyperlocal scale to develop and implement Community Emission Reduction Plans that include specific strategies to reduce air pollution emissions and exposure to improve community health. The work performed with communities has highlighted the need for additional reductions at a local scale. Reducing emissions of smaller in-community sources of air pollution such as residential woodburning devices and L&G equipment, can significantly improve the health of people that live, work, and play in these locales.

The CHPP coordinates robust and ongoing community engagement for the Bay Area priority areas as part of the AB 617 statute implementation of community steering committees, as well as CHPP Grants. The AB 617 Community Air Monitoring and Communities Emission Reduction Programs are community-led processes that are guided by multi-stakeholder steering committees. These include community members, CBOs that serve the community, local youth, as well as representatives from local government, public health offices, and local businesses and industry. These partnerships provide routine and ongoing opportunities for outreach with such new incentive programs, as they are funded.

[2] More details of the health burden assessments can be found on the websites for these programs: https://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program and https://www.baaqmd.gov/community-health/community-health-protection-program.

In October 2019, the BAAQMD's Board of Directors adopted the Community Emissions Reduction Plan for the West Oakland Community, also known as the West Oakland Community Action Plan (WOCAP). The WOCAP contains community-led recommendations for measures that, if implemented, would reduce health risk and exposure to emissions from local sources of air pollution and toxic air contaminants. Both L&G and Woodsmoke Reduction programs are included in the WOCAP. At least 60% of the EPA TAG monies will be awarded to projects the BAAQMD will develop program criteria that prioritizes funding for residents, gardeners, and organizations in the region's most impacted communities . with low-income residents.

3. Project Sustainability

Since the replacement technologies selected for this program are zero-emissions, the project will achieve **permanent quantifiable and voluntary reductions of PM 2.5 and NOx.**

The BAAQMD administers the Carl Moyer (CMP) and Mobile Source Incentive Programs (MSIP) that can fund the replacement of residential lawnmowers and larger horsepower commercial mowers. However, smaller commercial L&G equipment such as blowers, trimmers, hedgers and pole pruning devices are not eligible for funding under the authorizing guidelines. The BAAQMD will be working with the CARB, who oversees the CM Guidelines, to advocate for the inclusion of more L&G category types. The work conducted under this program will also be key in helping to document the potential benefits from replacement projects that provide highly localized benefits and serve as a model for how these categories could successfully be added to the program.

In addition to the proposed project, the BAAQMD's will continue to reduce PM emissions generated in the region through the following measures and activities:

- Regulations and permit requirements on stationary sources to limit PM emissions.
- Wood burning regulations to limit PM emissions from residential wood smoke.
- Control measures in the 2010 Clean Air Plan(2 Mb PDF, 287 pgs, revised 06/17/15) to reduce PM emissions.
- A comprehensive report (PDF) and summary (PDF) evaluating PM in the Bay Area.
- Preparation of an abbreviated State Implementation Plan to address U.S. EPA planning requirements.
- Administer grant programs to award an average of $65 million annually to sponsors who voluntarily replace older equipment that emits PM with cleaner alternatives.
- Public outreach to solicit input on our PM planning activities (archived webcasts and key documents are available in the table below).
- Extensive public outreach through the Winter Spare the Air program to encourage residents to refrain from wood-burning and notify when high PM levels are expected.

4. Environmental Results-Outcomes, Outputs and Performance Measures

Outputs and Outcomes. EPA TAG funds will be used to replace 760 wood fireplaces and wood stoves and 3,620 combustion-based L&G equipment with zero-emission technologies. This will result in reduced health risks associated with emissions in local communities, especially for L&G

service workers, residents, and those identified as EJ communities. In addition to significant reductions of toxic diesel and woodsmoke PM, the project will also significantly reduce NOx, a main ozone pre-cursor. Funding will also contribute to community engagement and awareness of residential heat pump technology as a clean heating alternative to wood-burning. BAAQMD will submit quarterly and final reports to the EPA, documenting progress and results in a White Paper, posted on the BAAQMD's website and presented at one (1) industry conference.

The project will result in annual emission reductions of 13.8 TPY PM 2.5 and lifetime emission reductions of over 127 tons PM 2.5 (lifetime of 10 years for heat pumps; 3 years for residential lawnmowers; and 5 years for all other L&G equipment). The project will also reduce approximately 7 tons of NOx emissions per year. Calculations, methodologies, assumptions and emission factors per the EPA and CARB are all included in *Other Narrative Attachments- Project Calculations*. Approximately 3,620 zero-emission heat pumps and 760 battery-electric L&G equipment will be deployed, accelerating broader adoption of zero-emission technology.

Projected numbers of equipment to be scrapped and replaced are shown in the tables below. Please note the precise mix of equipment or device types are estimated and may vary depending upon the specific need of the sub-grantees.

Lawn & Garden Equipment Type	**Est Qty**	**Emissions (lbs per year)**	
		NO_x Total	**PM2.5 Total**
Lawnmower – Residential	1,680	119	81
33" Mower	80	1,060	57
52" Mower	80	3,913	209
60" Mower	100	5,558	297
1-3 hp Blower	300	216	10
3-6 hp Blower	300	635	4,833
Grass Trimmer	160	240	13
Hedge Trimmer	160	178	9
TOTAL	2860	12,000	5,500

Woodburning Device Type	**Est Qty**	**Emissions (lbs per year)**	
		NOx Total	**PM2.5 Total**
Wood Fireplace	480	1,673	15,188
Woodstove-Uncertified	140	613	6,701
Woodstove-Cert. Non-Catalytic	140	396	2,539
TOTAL	760	2,700	24,500

* In the event a program category is undersubscribed, the BAAQMD's Executive Officer/APCO may reallocate the remaining portion of a program category's allocation to other categories based on demand, cost-effectiveness, and technology availability.

Performance measures. The BAAQMD will oversee project sub-grantees and project partners through contractual agreements. Project sub-grantees will be required to provide evidence in the form of receipts, invoices and photographic documentation of the scrapping of old equipment.

At L&G retail exchange events, subgrantees will bring in old L&G equipment for a voucher or discount on new battery-electric replacement equipment. for L&G subgrantees that apply on-line, participating dismantlers will inspect the old equipment and provide documentation of destruction verification. BAAQMD has a long history of implementing MOUs and working with local dismantlers for its light duty Vehicle Buyback and Clean Cars for All programs. The current agreements with authorized dismantlers would be amended in order to include contractual stipulations for the Woodsmoke and Lawn & Garden programs.

For the replacement of woodburning devices, participating contractors will provide certification forms confirming contractor is certified with the State of California and other business information, property where work was performed, any permit information, and description of costs, work performed, and device installed.

Project sub-grantees will also be required to provide documentation in the form of receipts, invoices, and photos or videos, of the purchase of new zero-emission equipment.

Performance Plan. Quarterly and final reporting to EPA will provide an account for measurable performance of the projects to ensure the environmental objectives are being met within the appropriate timeline and budget. Reports will also document any setbacks that may occur. The final report will measure environmental achievements, costs, and any barriers that may have taken place throughout the grant period.

Outputs, or activity status of program development and implementation, will be reported with tracking milestone deliverables such as:

- Approved list of eligible heat pumps and L&G equipment
- Program guidance and solicitation development
- Solicitation release dates
- Outreach conducted (website announcement, webinars, events)

Outcomes will be tracked, measured and reported, including:

- Number of grant agreements/contracts signed by participants
- Number of retail exchange events
- Number of projects initiated versus completed
- Number of fireplaces and woodstoves / fossil fuel L&G equipment scrapped
- Number of new heat pumps and zero-emission L&G equipment units purchased
- PM 2.5 emissions reduced (TPY)
- Lifetime PM 2.5 emissions reduced
- % of project funds provided within CHP areas and to low-income residents

Time Schedule and Tasks. Program development will begin upon EPA approval of BAAQMD's 2019/2020 Targeted Air Shed application and continue up to 5 years from contract signing, with a proposed project period ending 2025.

Date	**Activity**
First month	Accept award, develop and sign contract.

Next 5 months	Create program documents, amend contracts with Dismantler Project Partners, release solicitation, conduct outreach.
Next 4 years	Accept applications on a first come, first serve basis. Issue contracts and pay reimbursement claims. Approximately 120 fireplaces and woodstoves and 400 L&G equipment units will be replaced per year.
Last 6 months	Prepare and submit final reporting to EPA

5. Programmatic Capability and Past Performance

History and Past Performance. Since 1991, the BAAQMD has successfully administered more than $1.2 billion in revenue for grant programs that achieve surplus emissions reductions through air quality improvement projects with sub-grantees. The majority of the BAAQMD's funding has been awarded on a reoccurring or multi-term basis based on the BAAQMD's proven success and record of accountability. DERA grants received from the BAAQQMD since 2007 that have been completed are listed in the table below.

Table 7 - Eight U.S. EPA grant agreements entered into by the BAAQMD since 2007

Project Title	Assistance Agreement #	Funding Agency	CFDA #	Status
ARRA National Clean Diesel Program	2A-00T13701-0	EPA	81.502	The BAAQMD has successfully completed this project in conjunction with the Year 1 ARB Goods Movement Program. EPA granted the BAAQMD $2 million to replace 22 heavy-duty drayage trucks and retrofit 88 drayage trucks operating at the Port of Oakland.
Air Pollution Control Program	A-00905606 A-00905607 A-00905608	EPA	66-001	The EPA provided BAAQMD with approximately $1.2 million per year over three years to provide continuing support for activities which include strategic planning and evaluation, compliance assistance, developing state implementation plans, air monitoring, rulemaking, operating permits and all other program related activities. The BAAQMD has successfully completed this project.
DERA National Clean Diesel Program	DE-00T77901	EPA	66-039	The BAAQMD has successfully completed this project in conjunction with the Year 3 ARB Goods Movement Program. EPA granted the BAAQMD $1.5 million to replace 43 heavy-duty drayage trucks operating at the Port of Oakland.
DERA National Clean Diesel Program	DE – 00T96101	EPA	66-039	The BAAQMD has successfully completed this project in conjunction with the Year 3 ARB Goods Movement Program. EPA granted the BAAQMD $898,000 to replace 22 heavy-duty drayage trucks operating at the Port of Oakland.
PM 2.5 Monitoring Network	PM-97993201-3 PM-97993201 PM-98977301	EPA	66-034	The EPA provided the BAAQMD with approximately $330,000 per year over three years to monitor fine particulate matter with the diameter equal to or smaller than 2.5 µm in order to determine compliance with the national ambient air quality standards and determine reductions in air emissions.
National Air Toxics Trends Site (NATTS)	XA-00T63001	EPA	66-034	The EPA provided the BAAQMD with approximately $150,000 per year over five years to monitor the ambient concentration of air toxic compounds and address the needs of the ambient air monitoring community in San Jose.

Near Roadway Monitoring Grant	XA-00T83001	EPA	66-034	EPA granted the BAAQMD $600,000 to develop and locate a monitoring station as part of the near-roadway monitoring network development along the Interstate 80 corridor in the Berkley/Bay Bridge area.
Lead NAAQA Airport Study	XA-00T76401	EPA	66-034	The BAAQMD has successfully completed this project to monitor lead at Palo Alto Airport, Reid-Hillview Airport and San Carlos Airport. EPA granted the BAAQMD $322,264 to determine lead emission levels associated with piston-driven aircraft.

Prop 1B Goods Movement- The BAAQMD participated in the Proposition 1B Goods Movement Emission Reduction program since 2007 in partnership with the CARB to offer $100 million over a multiple-year contacts and is currently completing the award of the remaining $10,000 million. Financial incentives to freight-sector owners of equipment to upgrade to cleaner technologies has successfully met all of the assistance agreement requirements.

The Carl Moyer Program- The BAAQMD has participated in the CMP since the program began in Fiscal Year (FY) 1998-1999. Through the CMP, BAAQMD provides grants to both public and private entities to reduce emissions of NO_x, ROG and PM from existing heavy-duty engines by either replacing or retrofitting them. Eligible heavy-duty diesel engine categories include trucks and buses, mobile off-road equipment, marine vessels, locomotives, stationary agricultural pump engines, and forklifts. In December 2019, BAAQMD submitted application to CARB and was awarded $13,800,000 for the implementation of the CMP Year 22 funding cycle.

5. Staff Expertise and Qualifications.

The BAAQMD will dedicate staff resources to prepare contracts with sub-awardees, conduct pre- and post-inspections of L&G projects, review invoices, prepare quarterly and final reports, and make payments under this program. Staff identified below will also be tasked to ensure record-keeping is complete and quality control of information received following equipment dispersal is of the highest standard. Staff Specialists conduct public outreach and respond to public inquiries about the program, perform evaluations of project applications, monitor project performance, conduct inspections, process payment requests, staff exchange events, prepare draft reports, and schedule meetings/conference calls with project partners and the EPA liaison.

Supervising Staff Specialists are responsible for organizing, assigning, supervising, and reviewing staff specialist work including evaluations, emission calculations, inspections, contracts, payments, reporting and monitoring, and program outreach. They also supervise the development of administrative policies and programmatic tools for grant programs and research, administration, and technical activities necessary to achieve program objectives.

The Program Manager is responsible for program oversight and will review draft documents before they are finalized and participate in meetings as necessary. The Division Director will review the financial and programmatic objectives of the project to ensure they meet our contractual requirements. The Deputy Air Pollution Control Officer and the Executive Officer will present the project to the BAAQMD's Board of Directors and enter into the contract with the EPA, subcontractors, and sub-awardees. Ongoing record-keeping for the project will be the responsibility of the BAAQMD and will be funded through its general fund.

Karen Schkolnick, Director of the Strategic Incentives Division (SID) has worked at the BAAQMD since 2006. Ms Schkolnick provides lead direction to a staff of 27 in the oversight, management and administration of innovative incentives programs focused on criteria pollutant emissions reductions and climate protection. Ms Schkolnick holds a Bachelor of Arts in Environmental Studies from Oberlin College, and is a Registered Environmental Health Specialist certified by the CA Department of Public Health.

Chengfeng Wang, Manager in SID, he oversees the BAAQMD's on-road and off road incentive programs including wood-burning change-out and lawn and garden replacement projects. Before joining the BAAQMD, Mr Wang worked for the CARB as a Manager in the Air Quality Planning and Science Division, where he developed and improved CARB's emissions inventory models and provided technical support during the process of CARB's development of on- and off-road vehicle regulations. Mr Wang earned his Ph.D. degree in Marine Studies from the University of Delaware and his Master's degree in Vehicle Application Engineering and a Bachelor of Engineering degree from the Dalian Maritime University.

Amy Dao, Senior Staff Specialist, has worked at the BAAQMD since 2019 and leads the VW Zero-Emission Freight & Marine Program, focused on the replacement of off-road equipment with zero-emission technology. Prior to her current role, she worked at Pacific Gas & Electric where she worked with industrial entities, developing large load projects. Ms. Dao earned her Master in Environmental Management from Duke University, and her Bachelor's degree in Political Science from the University of California, San Diego.

Kenneth Mak, Supervising Staff Specialist oversees a team that manages the investment of approximately $25 million annually in local funds to projects that reduce motor vehicle trips and deploy clean-air vehicles. Mr. Mak holds a Bachelor of Science in Chemical Engineering from the University of California, Davis.

Adam Shapiro, Supervising Staff Specialist, has worked at the BAAQMD since 2009. Mr Shapiro supervises staff administering air quality improvement incentives through the on-road and off-road portions of the Carl Moyer and Goods Movement programs, including agricultural and portable engine projects. Mr. Shapiro holds a Bachelor's degree in Business Management Economics with an emphasis in Accounting from the University of California, Santa Cruz.

Amy Dao, Senior Staff Specialist, has worked at the BAAQMD since 2019 and leads the VW Zero-Emission Freight & Marine Program, focused on the replacement of off-road equipment with zero-emission technology. Prior to her current role, she worked at Pacific Gas & Electric where she worked with industrial entities, developing large load projects. Ms. Dao earned her Master in Environmental Management from Duke University, and her Bachelor's degree in Political Science from the University of California, San Diego.

6. Leveraged Funding

BAAQMD will provide $481,195 in applicant leverage funds for the woodsmoke component that is avaible for reprogramming from available General Funds dedicated for this purpose. These

funds will be used to support additional direct awards to sub-grantees and BAAQMD administrative cost match. BAAQMD will also commit for leverage $747,582 in local funds for the replacement of L&G equipment, from MSIF funds for eligible L&G equipment projects. The role of these leveraged funds would be used to replace CMP-eligible equipment types and limited to residential lawnmowers and higher horsepower (>25 hp) commercial lawnmowers. MSIF funds would leverage EPA monies to fund equipment not eligible under CMP guidelines.

The table below shows how BAAQMD proposes to allocate its leveraged funds between the two proposed programs and between admin and project cost categories.

	Leveraged Funds -Subgrantees	Leveraged Funds - Admin	Total EPA Funds Requested	Total Program Costs
Lawn & Garden	$500,000	$247,582	$3,906,027	$4,653,609
Wood Smoke	$291,060	$190,135	$4,958,345	$5,458,345
TOTAL	$791,060	$437,717	$8,864,372	$10,111,954

7. Budget (16%)

The total project cost, not including sub-grantee match, for the replacement of 3,620 pieces of equipment is estimated to be $10,093,149. Of this, funds that will passed on to sub-grantees are estimated to be $8,923,000.

Baseline Equipment Type		**Est Qty.**	**Cost**	
			Award ($)	**cost per award * qty**
Lawn & Garden	Lawnmower - Residential	1680	$200	$336,000
	33" Mower	80	$7,400	$592,000
	52" Mower	80	$15,200	$1,217,000
	60" Mower	100	$14,300	$1,427,000
	1-3 hp Blower	300	$200	$72,000
	3-6 hp Blower	300	$1,100	$317,000
	Grass Trimmer	160	$500	$72,000
	Hedge Trimmer	160	$300	$50,000
	Subtotal	2,860		$4,083,000
Wood Smoke	Wood Fireplace	480	$6,000	$2,880,000
	Woodstove-Uncertified.	140	$7,000	$980,000
	Woodstove-Cert. Non-Catalytic	140	$7,000	$980,000
	Subtotal	*760*		$4,840,000
Total		**3,620**		$8,923,000

The table below shows the estimated administrative costs for BAAQMD, including direct personnel, fringe, supplies and services, contract costs, and indirect by program component.

The amount of administrative costs requested from EPA will be capped at 9% of project funds awarded by EPA, or $731,321. A complete summary of the allocation of program from EPA and BAAQMD ("Leveraged Funds") for the two proposed categories is shown below:

	Total Awards to Subgrantees	EPA Admin @ 9%	BAAQMD funds (Leverage)	EPA Funds Requested	Total Program Costs
L&G	$4,083,511	$322,516	$247,582	$3,906,027	$4,653,609
Woodsmoke	$4,840,000	$409,405	$190,135	$4,958,345	$5,439,540
TOTAL	**$8,923,511**	$731,921	$456,522	$8,864,372	$10,111,954

The table below provides detail on estimated BAAQMD administrative costs including direct personnel, fringe, supplies and services, contract costs, and indirect by program component.

BAAQMD administrative costs	Woodsmoke	L&G
Total personnel	$246,803	$241,285
Total Fringe	$134,261	$131,259
Total Indirect	$175,477	$171,554
Total Subcontractor	$25,000	$25,000
Total Supplies	$18,000	$1,000
Total Program Admin Costs	**$599,540**	**$570,098**

Wood-burning devices and L&G equipment will be issued a contract that can be applied for online. Residents and commercial operators with smaller pieces of L&G equipment can also participate via community equipment exchanges that will be issued vouchers. subgrantees will receive the new equipment prior to contract execution and will submit a claim for payment to BAAQMD (or its subcontractor) to request disbursement of funds for the new zero-emission replacement equipment. BAAQMD staff and/or subcontractors will review each claim for accuracy and completeness. Once all requirements are met, grant funds will be distributed to the vendor. Milestones will be created and adhered to in order to facilitate timely distribution and expenditure of awarded grant funds.

For L&G equipment subgrantees can also apply online for vouchers and then bring old combustion-based equipment to events. Each piece of equipment that is exchanged will be issued a receipt. BAAQMD staff and/or subcontractors will be on-site in order assess that each piece of old equipment is operational and meets program requirements. Participating retailers will be issued a contract and submit receipts in order to confirm that vouchers were used for battery-electric zero-emission L&G equipment purchases.

BAAQMD's internal administrative policies and procedures are designed to ensure the BAAQMD recovers all allowable expenditures of federal EPA grant awards while meeting applicable federal requirements. Multiple layers of senior managers review and authorize all reimbursement requests and vouchers. All costs for tasks are incurred and disbursed prior to billing the EPA and are consistent billing methodologies used throughout the year. Duties related to the financial management of these awards are segregated; grant processing involves multiple reviews to ensure thoroughness, equity, and accuracy.